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18. AMPHIBIAN FAUNA OF KUDREMUKH NATIONAL PARK, WESTERN GHATS, INDIA

In spite of the pivotal role played by amphibians in the trophic dynamics of various ecosystems, they have not been paid due attention in most biodiversity and ecological studies, especially in national parks and sanctuaries, where scientific studies are focussed on larger animals. India possesses a wide network of more than 69 national parks and 392 sanctuaries, covering about 4% of her geographical area (Nair 1996). However, amphibian studies have been done in a few sanctuaries and national parks only (Pillai and Pattabiraman 1991; Ray and Tilak 1994, Dueti 1996, George *et al.* 1996, Radhakrishnan 1996, Zacharias and Bhardwaj 1996). The Kudremukh National Park (KNP) (13° 10'-13° 26' N; 75° 5'-75° 10' E) is located in the central Western Ghats and covers Chickmagalur and Udupi districts of Karnataka. With a total area of 6,000 sq. km, the Park encompasses steep, densely forested slopes to gently undulating hills, with an average altitude of 1,000 m above msl), covers dense evergreen montane vegetation, shola forests, lowland forests and grasslands. A large number of streams, three major rivers, namely Tunga, Bhadra and Netravathi and their tributaries water the terrain. The Park is known for its thick and undisturbed vegetation, but the biotic information is largely restricted to its floristic

composition (Pascal 1988) and a few reports of large animals. Daniels (1992) detailed amphibian distribution in the Western Ghats, but an extensive amphibian fauna of KNP is not available. Hence, we present this checklist of amphibians, compiled from the results of the survey of Kerekatte, Gangamoola, Kadambi, Bhagavathi Forest, Malleswara and Naravi regions of KNP during 1996-99.

All possible habitats of the study area during premonsoon (February to May), monsoon (June to September) and postmonsoon (October to January) were surveyed in all three years. The amphibians were identified in the field, and the species confirmed with the taxonomic keys of Boulenger (1890, 1920), Parker (1934), Taylor (1968), Daniel (1963, 1975), Daniel and Sekar (1989), as well as the latest field guides of Daniels (1997), and Bhatta (1998). Specimens were compared with those in the collection of the Zoological Survey of India, Southern Regional Station, Chennai. Overall, 26 species belonging to 4 families of Anura and 2 families of Apoda were recorded. Voucher specimens have been deposited in the Bombay Natural History Society, Mumbai. The list of amphibian species encountered, their number (N) in the sample and mean SVL \pm sd., of the present study, are as follows:

MISCELLANEOUS NOTES

Class: AMPHIBIA

Order: GYMNOPIHIONA

I. Family: Ichthyophidae

Genus: *Ichthyophis* Fitzinger, 1826

1. *Ichthyophis beddomei* Peters, 1879

Habitat: Semi-aquatic, on the margins of seepage stream under thick forest canopy.

N=11; Mean Total Length \pm sd: 209.4 \pm 37.68 mm; Range: 178.5-253.0 mm.

2. *I. bombayensis* Taylor, 1960

Habitat: Near the seepage stream under thick litter mat and organic mulch.

N=2; Mean SVL \pm sd: 345.5 \pm 149.5 mm; Range: 198.0-495 mm.

II. Family: Caecilidae

Genus: *Gegeneophis* Peters, 1879

3. *Gegeneophis carnosus beddomei* 1870

Habitat: Semi-aquatic, beneath the boulder on the margin of a forest swamp in the forest.

N= 1; SVL 204 mm.

Order: ANURA

I. Family: Rhacophoridae

Genus: *Rhacophorus* Kuhl and Van Hasselt, 1822

4. *Rhacophorus malabaricus* Jerdon, 1870

Habitat: Arboreal, recorded in the thick leafy crown of bushes near a stream.

N=2; Mean SVL \pm sd: 76.75 \pm 6.60 mm; Range: 72-86 mm.

Genus: *Philautus* Gistel, 1848

5. *Philautus femoralis* Günther, 1864

Habitat: Arboreal, bush dwelling.

N=1; SVL 19.50 mm.

6. *P. charius* Rao, 1937

Habitat: Recorded among forest floor litter.

N=6; Mean SVL \pm sd: 20.25 \pm 1.41 mm; Range: 17.5-21.5 mm.

7. *P. leucorhinus* Lichtenstein & Martens, 1856

Habitat: Arboreal, bush dwelling.

N=2; Mean SVL \pm sd: 30.5 \pm 2.83 mm; Range: 28.5-32.5 mm

8. *P. glandulosus* Jerdon, 1853

Habitat: Arboreal, collected from the bark.

N=2; Mean SVL \pm sd: 28.25 \pm 0.35 mm; Range: 28.0-28.5 mm.

II. Family: Bufonidae

Genus: *Bufo* Linnaeus, 1758

9. *Bufo melanostictus* Schneider, 1799

Habitat: Grassland on the periphery of the shola forests.

N=3; Mean SVL \pm sd: 66.34 \pm 3.3 mm; Range: 67-78 mm.

10. *B. beddomei* Günther, 1875

Habitat: Collected from the organic mulch on the floor of thick forest.

N=4; Mean SVL \pm sd: 38.5 \pm 3.2 mm; Range: 34-43 mm.

III. Family: Microhylidae

Genus: *Microhyla* Tschudi 1838

11. *Microhyla ornata* Duméril & Bibron, 1841

Habitat: Semi-aquatic margins of paddy fields.

N=4; Mean SVL \pm sd: 18.7 \pm 1.94 mm; Range: 16.5-21.0 mm.

IV. Family: Ranidae

Genus: *Rana* Linnaeus, 1758

12. *Rana (Limnonectes) limnocharis* Boie in Wiegmann, 1835

Habitat: Semi-aquatic, margins of the seepage stream, swamps associated with grass in open places.

N=6; Mean SVL \pm sd: 34.5 \pm 4.03 mm; Range: 29-42 mm.

13. *R. (Occidozyga) cyanophlyctis* (Schneider, 1799)

Habitat: Aquatic, lentic waterbodies.

N=9 (8 were sub-adults). Mean SVL \pm sd: 22.05 \pm 10.07 mm; Range: 10.5-47 mm.

14. *R. (Limnonectes) keralensis* Dubois, 1980
Habitat: Semi-aquatic, margins of watercourse.
N=4; Mean SVL \pm sd; 57.0 \pm 10.3 mm;
Range: 47-72 mm.
15. *R. aurantiaca* Boulenger, 1904
Habitat: Bush dwelling near the swamp.
N=2; Mean SVL \pm sd: 33.0 \pm 2.9 mm;
Range: 31-35 mm.
16. *R. curtipes* Jerdon, 1853
Habitat: Forest floor.
N=2; Mean SVL \pm sd: 72 \pm 7.07 mm;
Range: 67-77 mm.
17. *R. (Indirana) semipalmata* Boulenger, 1882
Habitat: Leaf litter and organic mulch on the margins of streams.
N=2; Mean SVL \pm sd: 37 \pm 1.42 mm;
Range: 36-38 mm.
18. *R. temporalis* Günther, 1864
Habitat: Semi-aquatic, margins of waterbodies.
N=3; Mean SVL \pm sd: 52.4 \pm 5.3 mm;
Range: 46.5-57 mm.
19. *R. (Indirana) beddomii* Günther, 1875
Habitat: Forest floor with thick, moist organic litter.
N=3; Mean SVL \pm sd: 52.33 \pm 8.5 mm;
Range: 44-61 mm.
20. *R. (Limnonectes) tigerina* Daudin, 1803
Habitat: Paddy field.
N=1; SVL 149 mm.
21. *R. malabarica* (Bibr.) Tschudi, 1838
Habitat: Forest-litter dwelling.
N=2; Mean SVL \pm sd: 62.5 \pm 3.5 mm;
Range: 59-69 mm.
- Genus: *Tomopterna* Duméril & Bibron, 1841
22. *Tomopterna (Sphaerotheca) rufescens* Jerdon, 1854
Habitat: Along with grasses, in the litter and near decaying wood.
N=6; Mean SVL \pm sd: 35.34 \pm 8.5 mm;
Range: 31-40 mm.
23. *T. (Sphaerotheca) breviceps* Schneider, 1799
Habitat: Forest floor.
N=4; Mean SVL \pm sd: 44 \pm 5.6 mm; Range: 38-53 mm.
- Genus: *Nyctibatrachus* Boulenger, 1882
24. *Nyctibatrachus major* Boulenger, 1882
Habitat: Aquatic, seepage stream in the forest.
N=6; Mean SVL \pm sd: 55.16 \pm 3.97 mm;
Range: 49-60 mm.
25. *N. aliciae* Inger *et al.*, 1984
Habitat: Aquatic, seepage stream under thick canopy in the forest.
N=6; Mean SVL \pm sd: 22.25 \pm 0.987 mm;
Range: 20.5-23 mm.
- Genus: *Micrixalus* Boulenger, 1888
26. *Micrixalus saxicola* Jerdon, 1853
Habitat: Aquatic, margins of seepage stream under thick forest canopy.
N=3; Mean SVL \pm sd: 27.3 \pm 2.08 mm;
Range: 25-29 mm.
- Among these 26 amphibians, 20 species were found to be endemic to the Western Ghats. Amphibian diversity has been well documented for the rest of the Western Ghats and India (Inger and Dutta, 1986; Molur and Walker, 1998). However, the actual diversity is always greater than the known (Inger and Dutta 1986). Comparison of species diversity of KNP with the adjoining Sringeri region (Krishnamurthy and Katre 1993) reveals the occurrence of *Gegeneophis carnosus*, *Nyctibatrachus aliciae*, *Philautus femoralis*, *P. charius*, *Micrixalus saxicola* and *Tomopterna breviceps* in KNP, apart from those recorded for Sringeri region.

The occurrence of a large number of endemic species in KNP reflects the availability of congenial habitats and the possibility of more new amphibian species in future expeditions.

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